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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,106	07/08/2003	Hung-Ming Tai	TAIH3002/EM	7689
23364 7590 02/15/2007 BACON & THOMAS, PLLC 625 SLATERS LANE FOURTH FLOOR ALEXANDRIA, VA 22314			EXAMINER STOUFFER, KELLY M	
			ART UNIT 1762	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		02/15/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/614,106

Applicant(s)

TAI ET AL.

Examiner

Kelly Stouffer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 January 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 10-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 7/8/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of claims 1-9 in the reply filed on 19 January 2007 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Claims 10-18 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

Specification

2. The disclosure is objected to because of the following informalities:

- Reference number 1 from Figures 1 and 2 is not defined in the specification
- Reference number 20 is used to designate both a "XY dimensional platform" and a "Z dimensional platform" on page 8 lines 13-14.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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3. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6 recites the limitation "said discharging planar electrode" in line 1. There is insufficient antecedent basis for this limitation in the claim as this claim depends from claim 1, not claim 5.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

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under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1- 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6719602 to Nakayama et al. in view of US Patent 5591312 to Smalley.

Regarding claim 1, Nakayama et al. discloses a method for controlling the length of a carbon nanotube (title) comprising providing a substrate (AFM cantilever/tip 6 in Fig 1) having at least a reference level on the surface of the substrate where at least one carbon nanotube (10 in Fig 1) is formed wherein the shortest vertical distance between the top of the nanotube and the reference level is H (as H is described in the specification, a reference level may be chosen at any point with the top of the nanotube to the reference point designated as H). The platform capable of moving the substrate (one of ordinary skill in the art would recognize that this is inherent to AFM cantilevers), providing a discharge electrode (20/22 in Fig 1) and moving the substrate with the platform while applying a voltage pulse to the electrode to cut the nanotube (column 4 lines 5-40). Nakayama et al. does not include a piezoelectric actuator which positions the electrode with a position sensor for detecting its height relative to the nanotube and determining the value I. Nakayama et al. does state that I (as defined in the applicant's specification) will be less than H (distance varied in column 4 lines 5-25). Smalley teaches using a piezoelectric actuator with a position sensor to move an electrode in

accordance with height sensed (column 7-8 lines 55-10 and columns 10-11 lines 57-11) because positioning the electrode precisely will make the opposing electrode (ie the carbon nanotube on the substrate) sharper, a property desirable for microscope probes (columns 7-8 lines 62-10).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Nakayama et al. to include using a piezoelectric actuator with a position sensor to move an electrode in accordance with height sensed as taught by Smalley in order to make the opposing electrode sharper.

Regarding claims 2 and 3, one of ordinary skill in the art would recognize that it is obvious for an AFM probe to be moved in the x, y, or z directions.

Regarding claim 4, one of ordinary skill in the art would recognize that it is obvious that an AFM probe be made of silicon.

Regarding claims 5 and 6, the electrode of Nakayama et al. is both a plate and a wire (needle) 0-15 degrees from the substrate surface, depending upon one's point of reference (20/22 in Fig 1).

Regarding claim 7, the carbon nanotubes of Nakayama et al. may be deposited by CVD (column 3 lines 45-55).

Regarding claim 8, the position sensor (40 in Fig 2) of Smalley may be considered a probe sensor as it is inside the chamber (12).

Regarding claim 9, the voltage of Nakayama et al. is pulsed (column 4 lines 55-60). However, Nakayama et al. discloses that the rate at which the nanotube is shortened depends upon the magnitude and pulse frequency of the pulse voltage

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(column 4 lines 63-67), and thus the magnitude and pulse frequency (discharge time as well) are result-effective variables. One of ordinary skill in the art would modify these quantities to freely control the cutting from ultra-low-speed to high-speed cutting (column 5 lines 15-25). It would have been obvious to one of ordinary skill in the art to modify Nakayama et al. to include the magnitude and pulse frequency in the claimed values absent evidence showing a criticality for the claimed ranges, in order to freely control the cutting from ultra-low-speed to high-speed cutting.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kelly Stouffer whose telephone number is (571) 272-2668. The examiner can normally be reached on Monday - Thursday 7:00-5:30.

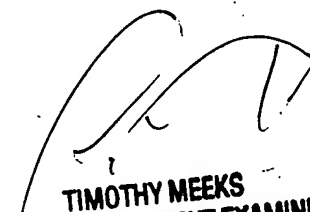
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Kelly Stouffer
Examiner
Art Unit 1762

kms



TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER